New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-4253

Henry G. Williams
Commissioner

November 12, 1986

Mr. Mel Weiss
USDA Forest Service
Louis C. Wyman Forestry Sciences Laboratory
P.O. Box 640
Durham, New Hampshire 03824

Dear Mel:

Enclosed is a computer printout providing the information your office requested regarding forest insect and disease conditions in New York State. Margaret Miller-Weeks thought the printout would serve her purpose.

One comment on the printout. Under the light, medium and heavy columns you see: ? acres. What this means is that light, medium or heavy damage was observed, but no acreage figures are available.

The pear thrips problem that was so widespread in 1985 occurred to a far less degree in 1986.

An apparently new disease of Norway maple was first reported to us this week. It is a tar spot disease according to Dr. George Huddler of Cornell University. George is studying the biology of the disease. Spots are about one inch in diameter and sometimes several spots cover the whole leaf. Norway maples lose their leaves when severe infections occur. The disease occurs along the New York State Thruway in the Utica area and an isolated infected center occurs in East Aurora. The disease is unlike common tar spot in that the spots are much larger and apparently more virulent.

As you can see from our printout, there were several tree species declining. Ash decline in most instances shows the symptoms of ash yellows disease, which has been described by Dr. Wayne Sinclair of Cornell University. We believe that the forest grown sugar maple that is reported declining is

associated with sugaring, cattle grazing and wet sites. Dr. George Huddler has investigated this sugar maple decline. Red maple decline is occurring primarily on very wet sites. Oak declines we are seeing are in forests defoliated in the early 1980's by gypsy moths.

Red pine declines are increasing on our State Forests. Declines are preceded by slow growth for about 10 to 15 years. The slowing of growth is due to stagnation of the trees from competition. Stands that are thinned after stagnation decline more rapidly than non-thinned stands. We have found blue-stain fungus, Ceratostomella pilifera, and a Cerambycid beetle in declining pine. We are attempting to recover pinewood nematoids from declining red pines. Red pine dies from the top down. Beetle attacks initially occur on the large lateral branches. Blue-stain fungus infections originate at the sites of the beetle attacks. Death of the pines is rapid. Blue-stain fungus infections move down the tree. Pine trees retain their dead needles and cones for a period of months after death. Red pine is also declining on wet sites.

Red pine scale and red pine adelgid were found further north in New York State in October than previously known to occur. The scale occurs in northeastern Dutchess County. We found the adelgid for the first time in the Town of LaGrange, Dutchess County.

If you have questions on this report, please contact Mike Birmingham.

Sincerely,

Daniel W. Weller, Chief
Bureau of Forest Resource Management

Enc.

PROBLEM	HOST	COUNTY	LIGHT	MODERATE	SEVERE	TREND	REMARKS
Abiotic, Frost Damage	Ash,Sumac,Conifers	St. Lawrence	0	0	0	N/A	Frost on June 2 - damaged tender leaves and candle growth.
Abiotic, Ice Damage	Hardwoods (Mostly)	Herkimer	0	0	0	N/A	Crown breakage.
Abiotic, Ice Damage	Hardwoods (Mostly)	Oneida	0	0	0	N/A	Crown breakage.
Abiotic, Water Damage	All species	Genesee	0	0	40	increasing	Death from excessive water. 1200 cords valued at $12,000 killed.
Abiotic, Winter Damage	Conifers	Lewis	0	0	0	N/A	Damage is severe in spots along roadsides, esp. on White pine & [illegible].
Abiotic, Winter Damage	Conifers	St. Lawrence	0	0	0	N/A	Damage is severe in spots along roadsides, esp. on White pine & [illegible].
Decline, Ash	Ash, White	Albany	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Albany	0	? acres	? acres	increasing	Town of Berne.
Decline, Ash	Ash, White	Cayuga	0	0	0	increasing	Ash decline seems to be spreading slowly southward.
Decline, Ash	Ash, White	Chemung	0	40	0	increasing	Town of Catlin. [Paul Novak 607-962-1739]
Decline, Ash	Ash, White	Chenango	0	0	0	increasing	Ash decline seems to be spreading slowly southward.
Decline, Ash	Ash, White	Columbia	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Columbia	0	? acres	? acres	increasing	Town of Ancram.
Decline, Ash	Ash, White	Cortland	0	0	0	increasing	Ash decline seems to be spreading slowly southward.
Decline, Ash	Ash, White	Delaware	?acres	0	0	increasing	Mortality losses of white ash.
Decline, Ash	Ash, White	Delaware	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Fulton	0	0	0	increasing	Dieback has increased during the past two or three years.
Decline, Ash	Ash, White	Genesee	0	25	0	unknown	Town of Bethany-[James Howe 716-343-5291]. Several pole size have [illegible].
Decline, Ash	Ash, White	Greene	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Herkimer	0	0	0	stable	None.
Decline, Ash	Ash, White	Herkimer	40	0	0	increasing	None.
Decline, Ash	Ash, White	Herkimer	0	0	10	unknown	Aprox. 10-15% mortality, & aprox. 75% of remaining trees have symptoms.
Decline, Ash	Ash, White	Jefferson	0	0	0	stable	None.
Decline, Ash	Ash, White	Lewis	0	0	0	stable	None.
Decline, Ash	Ash, White	Madison	0	0	0	increasing	Ash decline seems to be spreading slowly southward.
Decline, Ash	Ash, White	Montgomery	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Montgomery	0	0	?acres	increasing	Mortality losses of white ash.
Decline, Ash	Ash, White	Oneida	0	0	0	stable	None.
Decline, Ash	Ash, White	Onondaga	0	0	0	increasing	Ash decline seems to be spreading slowly southward.
Decline, Ash	Ash, Green	Orleans	7	0	0	increasing	None.
Decline, Ash	Ash, White	Otsego	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Otsego	0	?acres	0	increasing	Mortality losses of white ash.
Decline, Ash	Ash, White	Rensselaer	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Schenectady	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Schoharie	0	0	?acres	increasing	Mortality losses of white ash.
Decline, Ash	Ash, White	Schoharie	0	? acres	? acres	increasing	Mortality/decline of hedgerow/woodland Ash trees.
Decline, Ash	Ash, White	Steuben	10	0	0	increasing	Town of Prattsburg. [Harry G. Bartz 607-522-4524]
Decline, Ash	Ash, White	Steuben	40	0	0	increasing	Town of Prattsburg. [Irene D. Curry 607-566-2825]
Decline, Ash	Ash, White	Tompkins	0	0	0	increasing	Ash decline seems to be spreading slowly southward.
Decline, Ash	Ash, White	Wayne	0	15	0	stable	A third of ash healty. Salvaged 5 cords, 7.4 MBF; mortality, rai[illegible]
Decline, Ash	Ash, White	Wayne	0	0	5	increasing	Good site for Ash but all is dead or dying.
Decline, Maple	Maple, Sugar	Herkimer	0	15	0	increasing	On cooperator's land; twig or complete tree mortality.
Decline, Maple	Maple, Sugar	Herkimer	0	0	30	increasing	Town of Ohio [Tom Shepard property]. All age classes affected.
Decline, Maple	Maple, Sugar	Herkimer	? acres	0	0	increasing	Town of Ohio. All stages of decline observed on stand 6.
Decline, Maple	Maples, Sugar, Red	Jefferson	0	0	0	increasing	Many public inquires; increased red maple affected on Tughill Plateau.
Decline, Maple	Maples, Sugar, Red	Lewis	0	0	0	increasing	Many public inquires; increased red maple affected on Tughill Plateau.
Decline, Maple	Maple, Sugar	Oneida	275	0	0	increasing	Town of Forestport.
Decline, Maple	Maples, Sugar, Red	St. Lawrence	0	0	0	increasing	Public awareness increasing along with increased decline symptoms.
Decline, Maple	Maple, Red	Wayne	0	0	300	increasing	Extremely extensive mortality losses. Need to drain area.
Decline, Oak	Oak, Red	Albany	? acres	0	0	unknown	No reason for decline apparent. Stand thinned in 1982-83.
Decline, Oak	Oak, Red	Chemung	100	0	0	increasing	Gypsy Moth def., poor drainage, Chestnut borer, Shoestring root-rot.
Decline, Oak	Oak, White	Steuben	0	0	0	increasing	Agents attacking: two-lined chestnut borer, root root; stress dro[illegible]
Decline, Pine	Pine, Red	Montgomery	0	? acres	? acres	increasing	Problem may be site/weather related.

SORTED BY PROBLEM AND COUNTY

Decline, Pine	Pine, Red	Otsego	? acres	0	0	increasing	None.
Decline, Pine	Pine, Red	Otsego	0	? acres	? acres	increasing	Problem may be site/weather related.
Decline, Pine	Pine, Red	Schoharie	? acres	0	0	increasing	Secondary infestation by bark beetles. Condition appears persistent.
Decline, Pine	Pine, Red	Schoharie	0	? acres	? acres	increasing	Secondary infestation by bark beetles. Condition appears persistent.
Decline, Spruce	Spruce, Red	Herkimer	0	? acres	? acres	increasing	None.
Decline, Spruce	Spruce, Red	Herkimer	8000	15000	3500	increasing	None.
Decline, Spruce	Spruce, Red	Jefferson	500	2000	200	increasing	None.
Decline, Spruce	Spruce, Red	Lewis	6000	25000	1300	increasing	None.
Decline, Spruce	Spruce, White	Lewis	0	25	0	increasing	Two stans Lewis #7, foliage symptoms, butt swell, resin flow, thin crown
Decline, Spruce	Spruce, Red	Oneida	0	? acres	? acres	increasing	None.
Decline, Spruce and Tamarack	Tamarack; Spruce, Red	St. Lawrence	0	4000	10000	stable	Scattered; heavier in southeastern St. Lawrence Co.
Decline, Tamarack	Tamarack	Herkimer	0	0	0	increasing	Substantial increase in number of trees affected - two yrs. stable.
Decline, Tamarack	Tamarack	Lewis	0	0	0	increasing	Substantial increase in number of trees affected - two yrs. stable.
Decline, Tamarack	Tamarack	Oneida	0	0	0	increasing	Substantial increase in number of trees affected - two yrs. stable.
Defoliator, Beetle, Locust Leafminer	Locust, Black	Dutchess	? acres	0	0	unknown	
Defoliator, Beetle, Locust Leafminer	Locust, Black	Orange	? acres	0	0	unknown	
Defoliator, Beetle, Locust Leafminer	Locust, Black	Putnam	? acres	0	0	unknown	
Defoliator, Beetle, Locust Leafminer	Locust, Black	Rockland	? acres	0	0	unknown	
Defoliator, Beetle, Locust Leafminer	Locust, Black	Sullivan	? acres	0	0	unknown	
Defoliator, Beetle, Locust Leafminer	Locust, Black	Ulster	? acres	0	0	unknown	
Defoliator, Beetle, Locust Leafminer	Locust, Black	Westchester	0	0	10	unknown	Ten acres near Golders Bridge and Route 684 defoliated.
Defoliator, Moth, Cherry Scallop Shell	Cherry, Black	Herkimer	0	0	0	increasing	None.
Defoliator, Moth, Cherry Scallop Shell	Cherry, Black	Lewis	0	0	0	increasing	None.
Defoliator, Moth, Cherry Scallop Shell	Cherry, Black	Oneida	0	0	0	increasing	None.
Defoliator, Moth, Eastern Tent Caterpillar	Cherry, Black	Delaware	? acres	0	0	unknown	Damage consists of light defoliation; no mortality expected.
Defoliator, Moth, Eastern Tent Caterpillar	Apple, Cherry, Hardwoods (other)	Herkimer	0	0	0	increasing	Marked increase over last year.
Defoliator, Moth, Eastern Tent Caterpillar	Apple, Cherry, Hardwoods (other)	Jefferson	0	0	0	increasing	Marked increase over last year.
Defoliator, Moth, Eastern Tent Caterpillar	Apple, Cherry, Hardwoods (other)	Lewis	0	0	0	increasing	Marked increase over last year.
Defoliator, Moth, Eastern Tent Caterpillar	Apple, Cherry, Hardwoods (other)	Oneida	0	0	0	increasing	Marked increase over last year.
Defoliator, Moth, Eastern Tent Caterpillar	Cherry, Black	Otsego	? acres	0	0	unknown	Damage consists of light defoliation; no mortality expected.
Defoliator, Moth, Eastern Tent Caterpillar	Apple, Cherry, Hardwoods (other)	St. Lawrence	0	0	0	increasing	Marked increase over last year.
Defoliator, Moth, Fall Cankerworm	Hardwoods	Jefferson	0	0	0	increasing	Light feeding larvae noted.
Defoliator, Moth, Fall Cankerworm	Hardwoods	Lewis	0	0	0	increasing	Light feeding larvae noted.
Defoliator, Moth, Fall Webworm	Hardwoods	Albany	?acres	0	0	Stable	No mortality losses observed.
Defoliator, Moth, Fall Webworm	Hardwoods	Delaware	?acres	0	0	Stable	No mortality losses observed.
Defoliator, Moth, Fall Webworm	All susceptable	Fulton	0	250	175	increasing	Second consecutive year it has defoliated trees in the forest.
Defoliator, Moth, Fall Webworm	All susceptable	Fulton	0	250	175	increasing	Second consecutive year it has defoliated trees in the forest.
Defoliator, Moth, Fall Webworm	Hardwoods	Green	?acres	0	0	Stable	No mortality losses observed.
Defoliator, Moth, Fall Webworm	Hardwoods	Herkimer	0	0	0	increasing	None.
Defoliator, Moth, Fall Webworm	Hardwoods	Herkimer	0	0	0	increasing	None.
Defoliator, Moth, Fall Webworm	Hardwoods	Jefferson	0	0	0	increasing	Significant increase in population.
Defoliator, Moth, Fall Webworm	Hardwoods	Lewis	0	0	0	increasing	Significant increase in population. Some trees with numerous webs.
Defoliator, Moth, Fall Webworm	Hardwoods	Otsego	?acres	0	0	Increasing	No mortality losses observed.
Defoliator, Moth, Fall Webworm	Hardwoods	Schenectady	?acres	0	0	Stable	No mortality losses observed.
Defoliator, Moth, Fall Webworm	Hardwoods	Schoharie	?acres	0	0	Stable	No mortality losses observed.
Defoliator, Moth, Fall Webworm	Hardwoods	St. Lawrence	0	0	0	increasing	None.
Defoliator, Moth, Forest Tent Caterpillar	Maples	Cortland	0	0	0	unknown	#FIRST TIME OBS. IN REGION. Populations appear light.
Defoliator, Moth, Forest Tent Caterpillar	Ash, Aspen, Maple (Sugar)	Hamilton	0	550	100	unknown	None.
Defoliator, Moth, Forest Tent Caterpillar	Hardwoods (mostly maples)	Lewis	0	0	0	increasing	Generally light, but feeding larvae noted for first time in years.
Defoliator, Moth, Forest Tent Caterpillar	Aspen & Sugar Maple	Lewis	0	0	0	increasing	Slight increase in egg mass counts. No defol. expected.
Defoliator, Moth, Forest Tent Caterpillar	Maples	Tompkins	0	0	0	unknown	#FIRST TIME OBS. IN REGION. Populations appear light.
Defoliator, Moth, Gypsy Moth	Oak	Allegany	0	10000	14200	stable	~~Aspen and Willow~~ along streams host to much of the moderate defoliation.
Defoliator, Moth, Gypsy Moth	Oak	Allegany	0	0	0	increasing	Doencyrtus, an egg parasite, first observed in the Olean area on April 1
Defoliator, Moth, Gypsy Moth	Oak	Broome	0	0	0	stable	Very light pop.'s at present. May be building up due to dry weather.
Defoliator, Moth, Gypsy Moth	Oak	Cattaraugus	0	13000	10000	down	Aspen and Willow along streams host to much of the moderate defoliation.
Defoliator, Moth, Gypsy Moth	Oak	Erie	0	1350	0	increase	See regional reports.

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	Defoliator, Moth, Gypsy Moth	Oak	Essex	750	0	0	increasing	None.
	Defoliator, Moth, Gypsy Moth	All Susceptable	Fulton	750	75	37	increasing	Population beginning to buildup.
	Defoliator, Moth, Gypsy Moth	Oak	Fulton	0	? acres	0	decreasing	Pop.'s low and bottomed out. Increase in egg mass size.
	Defoliator, Moth, Gypsy Moth	Oak	Hamilton	0	? acres	0	decreasing	Pop.'s low and bottomed out. Increase in egg mass size.
	Defoliator, Moth, Gypsy Moth	All Susceptable	Hamilton	750	75	37	increasing	Population beginning to buildup.
	Defoliator, Moth, Gypsy Moth	Oaks, Hardwoods	Jefferson	1500	400	600	increasing	Grindstone Island, 500 acres; Butterfield Lake, 500 acres defoliated.
	Defoliator, Moth, Gypsy Moth	Oak	Jefferson	1500	400	600	increasing	Egg mass numbers increased from 1985 to 1986. Grindstone and Butterfi
	Defoliator, Moth, Gypsy Moth	Oaks, Hardwoods	Jefferson	0	400	600	increasing	None.
	Defoliator, Moth, Gypsy Moth	Oaks, Hardwoods	Lewis	0	0	0	increasing	Egg masses have increased substantially in number over prior year.
	Defoliator, Moth, Gypsy Moth	Oak	Lewis	0	0	0	increasing	Egg mass numbers increased from 1985 to 1986.
	Defoliator, Moth, Gypsy Moth	Oaks, Hardwoods	Lewis	? acres	? acres	0	increasing	Generally light but increasing.
	Defoliator, Moth, Gypsy Moth	Oak	Livingston	400	1300	1700	increasing	None.
	Defoliator, Moth, Gypsy Moth	Oak	Nassua	0	0	0	stable	Low population, no reports of defoliation, observed many dead oaks.
	Defoliator, Moth, Gypsy Moth	Oak	New York City	0	0	0	stable	Ground checks bases of report of no defoliation.
	Defoliator, Moth, Gypsy Moth	Oak	Ontario	1900	7500	9400	increasing	None.
	Defoliator, Moth, Gypsy Moth	Oak	Orange	4110	6910	11	increasing	Populations peaked in Fallasides park.
	Defoliator, Moth, Gypsy Moth	Oak	Regionwide	? acres	0	0	unknown	Flights over nine counties.
	Defoliator, Moth, Gypsy Moth	Oak	Rockland	1510	2010	8160	stable	Some areas of decrease, but expect overall increase next year.
	Defoliator, Moth, Gypsy Moth	Oak	Steuben	3300	15000	18300	increasing	None.
	Defoliator, Moth, Gypsy Moth	Oaks, Hardwoods	St. Lawrence	4000	500	2000	increasing	Severe defoliation in south Hammond; Lks Pleasand, B
	Defoliator, Moth, Gypsy Moth	Oak	Suffolk	0	0	0	stable	Low population, no reports of defoliation, observed many dead oaks.
	Defoliator, Moth, Gypsy Moth	Oak	Sullivan	11785	1070	23000	increasing	Some areas of decrease, but expect overall increase next year.
	Defoliator, Moth, Gypsy Moth	Oak	Tioga	0	0	0	stable	Very light pop.'s at present. May be building up due to dry weather.
	Defoliator, Moth, Gypsy Moth	Oak	Tompkins	0	0	0	stable	Very light pop.'s at present. May be building up due to dry weather.
	Defoliator, Moth, Gypsy Moth	Oak	Ulster	13640	7980	27520	increasing	Expect overall increase next year.
	Defoliator, Moth, Gypsy Moth	Oak	Warren	0	135	600	increasing	None.
	Defoliator, Moth, Gypsy Moth	Oak	Washington	0	0	0	N/A	New egg masses small. Virus killed caterpillars at Prospect Mtn.
	Defoliator, Moth, Gypsy Moth	Oak	Washington	0	0	600	increasing	None.
	Defoliator, Moth, Gypsy Moth	Oak	Wyoming	0	1350	0	increase	See regional reports.
	Defoliator, Moth, Gypsy Moth	Oak	Yates	1100	1300	2400	declining	None.
	Defoliator, Moth, Maple Leaf Cutter	Maple, Sugar	Herkimer	0	0	0	stable	Some areas of moderate defoliation.
	Defoliator, Moth, Maple Leaf Cutter	Maple, Sugar	Jefferson	0	0	0	decreasing	None.
	Defoliator, Moth, Maple Leaf Cutter	Maple, Sugar	Lewis	0	0	0	decreasing	Some areas of light defoliation. Heavy mortality of first instars
	Defoliator, Moth, Maple Leaf Cutter	Maple, Sugar	Oneida	0	0	0	stable	Some areas of moderate defoliation.
	Defoliator, Moth, Maple Leaf Cutter	Maple, Sugar	St. Lawrence	0	0	0	decreasing	Heavy populations are scattered.
	Defoliator, Moth, Oak Leaf Tier	Oaks, Red, White	Fulton	0	0	0	increasing	Buildup in population for two consecutive years; causing tip dieback.
	Defoliator, Moth, Oak Leaf Tiers	Oak	Fulton	100	200	0	increasing	Populations building up in portions of State Forest Fulton #2.
	Defoliator, Moth, Oak Skeletonizer	Oak	Columbia	?acres	0	0	stable	No mortality observed.
	Defoliator, Moth, Oak Skeletonizer	Oak, Red	Putnam	? acres	0	0	declining	Scattered damage from this insect.
	Defoliator, Moth, Oak Skeletonizer	Oak	Rensselaer	?acres	0	0	stable	No mortality observed.
	Defoliator, Moth, Oak Skeletonizer	Oak, Red	Ulster	? acres	0	0	declining	Scattered damage from this insect.
	Defoliator, Moth, Oak Skeletonizer	Oak, Red	Westchester	? acres	0	0	declining	Scattered damage from this insect.
	Defoliator, Moth, Saddled Prominent	Maple, Sugar	Lewis	0	0	0	increasing	Survey with Allen found increased number of eggs and larvae.
	Defoliator, Moth, Satin	Poplar, Willow	St. Lawrence	0	0	0	increasing	Many public inquires; problem along the St. Lawrence River.
	Defoliator, Moth, Tussock	Hardwoods	Albany	?acres	0	0	unknown	Caterpillar observed but no damage.
	Defoliator, Moth, Tussock	Hardwoods	Columbia	?acres	0	0	unknown	Caterpillar observed but no damage.
	Defoliator, Moth, Tussock	Hardwoods	Green	?acres	0	0	unknown	Caterpillar observed but no damage.
	Defoliator, Moth, Tussock	Hardwoods	Rensselaer	?acres	0	0	unknown	Caterpillar observed but no damage.
	Defoliator, Moth, Tussock	Hardwoods	Schenectady	?acres	0	0	unknown	Caterpillar observed but no damage.
	Defoliator, Sawfly, Introduced Pine	Pine, Red, Scotch, White	Fulton	200	45	0	increasing	Worse pest where Scotch and White pine grown together.
	Defoliator, Sawfly, Larch	Tamarack	Fulton	100	300	100	unknown	None
	Defoliator, Sawfly, Larch	Tamarack	Hamilton	100	300	100	unknown	~~None~~
	Defoliator, Sawfly, Leconte	Pines, Pitch, Red, White, Scotch	Fulton	0	200	100	increasing	Defoliation occuring on 16 inch DBH red pine.
	Defoliator, Sawfly, Leconte	Pines, Pitch, Red, White, Scotch	Hamilton	0	200	100	increasing	Defoliation occuring on 16 inch DBH red pine.
	Defoliator, Sawfly, Pine False Webworm	Pine, Red	Schoharie	0	60	0	increasing	Defol. in stands A-10 & 11 in State Refor. area.
	Defoliator, Sawfly, Pine False Webworm	Pine, Red, Scotch, White	St. Lawrence	4500	22	465	increasing	Control proposed. Heavy in Parrishville - Hopkinton and Fort Jackson.

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Foliage and Bud, Bear Thrips	Maple, Sugar	Albany	0	? acres	? acres	decreasing	Damage includes leaf tatter and chlorotic spotting. No mort. expected.
Foliage and Bud, Bear Thrips	Maples	Broome	0	0	0	unknown	Newly observed in region last year; may pose future problem.
Foliage and Bud, Bear Thrips	Maples	Cortland	0	0	0	unknown	Newly observed in region last year; may pose future problem.
Foliage and Bud, Bear Thrips	Maple, Sugar	Rensselaer	0	? acres	? acres	decreasing	Damage includes leaf tatter and chlorotic spotting. No mort. expected.
Foliage and Bud, Bear Thrips	Maple, Sugar	Schoharie	0	? acres	? acres	decreasing	Damage includes leaf tatter and chlorotic spotting. No mort. expected.
Foliage and Bud, Bear Thrips	Maples	Tioga	0	0	0	unknown	Newly observed in region last year; may pose future problem.
Foliage and Bud, Bear Thrips	Maples	Tompkins	0	0	0	unknown	Newly observed in region last year; may pose future problem.
Foliage and Bud, Bear Thrips	Maples	Ulster	0	? acres	0	unknown	Red maples on School property defoliated following thrips damage.
Foliage Disease, Anthracnose	Maple, Red, Sugar	Fulton	0	0	0	increasing	None.
Foliage Disease, Anthracnose	Maple, Red, Sugar	Hamilton	0	0	0	increasing	None.
Foliage Disease, Leaf Spots	Maples	Herkimer	0	0	0	stable	None.
Foliage Disease, Leaf Spots	Maples	Oneida	0	0	0	stable	None.
Foliage Disease, Lophodermium Needle Cast	Pines, Red, Scotch	Fulton	0	75	25	unknown	Affecting Christmas trees.
Foliage Disease, Lorhodermium Needle cast	Pine	Steuben	0	10	0	decreasing	Town of Bradford (John Bricklemyer 716-223-3162)
Foliage Disease, Rust, Cedar Apple	Cedar, Eastern Red	Schoharie	0	0	0	unknown	Found mainly on roadside trees invading pastures; no mortality yet.
Foliage Disease, Rust, Fir Fern	Fir, Concolor (White)	Fulton	0	0	0	increasing	Increased use of concolor fir for Christmas trees.
Foliage Disease, Rust, Fir Fern	Fir, Concolor (White)	Hamilton	0	0	0	increasing	Increased use of concolor fir for Christmas trees.
Foliage Disease, Rust, Unknown	Hawthorn	Jefferson	0	0	0	unknown	Heavy northern Jefferson; yellow, red leaves; premature leaf drop.
Foliage Disease, Rust, Unknown	Hawthorn	St. Lawrence	0	0	0	increasing	Heavy northern Jefferson; yellow, red leaves; premature leaf drop.
Foliage, Abnormal	Pine, Eastern White Pine	Orange	? acres	0	0	unknown	Fallen needles gave pines a yellow cast - not a pest problem.
Foliage, Abnormal	Pine, Eastern White Pine	Sullivan	? acres	0	0	unknown	Fallen needles gave pines a yellow cast - not a pest problem.
Foliage, Abnormal	Pine, Eastern White Pine	Ulster	? acres	?	0	unknown	Fallen needles gave pines a yellow cast - not a pest problem.
Mammal, Porcupine	Conifers, Hardwoods	Herkimer;Oneid	?	?	0	increasing	Stem Girdling.
Mammal, Porcupine	Conifers, Hardwoods	Herkimer;Oneid	?	?	0	increasing	Stem Girdling.
Miner, Moth, Arborvitae Leaf	Cedar, Northern White	Herkimer	0	0	0	stable	None.
Miner, Moth, Arborvitae Leaf	Cedar, Northern White	Oneida	0	0	0	stable	None.
Miner, Moth, Arborvitae Leaf	Cedar, Northern White	Otsego	0	? acres	0	unknown	Foliage heavily damaged, but currently confined to ornamentals.
Miner, Moth, Arborvitae Leaf	Cedar, Northern White	Schoharie	0	? acres	0	unknown	Foliage heavily damaged, but currently confined to ornamentals.
Miner, Pine spp.	Pine, Pitch	Suffolk	0	?	0	unknown	Nearly all pitch pine had needle damage from miner.
Miner, Sawfly, Birch Leaf	Birch, White	Delaware	0	? acres	0	unknown	First widespread damaged observed on woodland trees.
Miner, Sawfly, Birch Leaf	Birches (esp. Grey)	Fulton	0	? acres	0	increasing	Much leaf browning/summer-85; little direct mort.
Miner, Sawfly, Birch Leaf	Birches, Grey, White	Herkimer	0	0	0	stable	Moderate to high levels in spots.
Miner, Sawfly, Birch Leaf	Birch, White	Herkimer	0	0	0	stable	None.
Miner, Sawfly, Birch Leaf	Birches, Grey, White	Jefferson	0	0	0	increasing	Defoliation generally heavier than last year.
Miner, Sawfly, Birch Leaf	Birches, Grey, White	Lewis	0	0	0	increasing	Defoliation generally heavier than last year.
Miner, Sawfly, Birch Leaf	Birches, Grey, White	Oneida	0	0	0	stable	Moderate to high levels in spots.
Miner, Sawfly, Birch Leaf	Birch, White	Oneida	0	0	0	stable	None.
Miner, Sawfly, Birch Leaf	Birch, White	Otsego	0	? acres	0	unknown	First widespread damaged observed on woodland trees.
Miner, Sawfly, Birch Leaf	Birch, White	Schoharie	0	? acres	0	unknown	First widespread damaged observed on woodland trees.
Miner, Sawfly, Birch Leaf	Birches, Grey, White	St. Lawrence	0	0	0	stable	Persistent problem which remains constant.
Shoestring rot, Fall Browning	Pine, Pitch	Suffolk	0	0	0	N/A	Chorotic coloration due to yellow needles lodged in green needles.
Root Rot, Shoestring	Pines, Red, Scotch, White	Fulton	0	200	0	increasing	None.
Root Rot, Shoestring	Pines, Red, Scotch, White	Hamilton	0	200	0	increasing	None.
Root Rot, Shoestring	Pine, Red	Otsego	? acres	0	0	stable	Scattered mortality found; small amount of add'l. mortality found.
Stem Disease, Beech Bark	Beech, American	Allegheny	0	0	0	increasing	Heaviest mortality in Allegheny co. Gets lighter going west and south.
Stem Disease, Beech Bark	Beech, American	Broome	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Cattaraugus	0	0	0	increasing	Heaviest mortality in Allegheny co. Gets lighter going west and south.
Stem Disease, Beech Bark	Beech, American	Cayuga	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Chautauqua	0	0	0	increasing	Heaviest mortality in Allegheny co. Gets lighter going west and south.
Stem Disease, Beech Bark	Beech, American	Chenango	0	0	0	increasing	Control recommended is salvage.
Stem Disease, Beech Bark	Beech, American	Chenango	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Cortland	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Erie	0	0	0	increasing	Heaviest mortality in Allegheny co. Gets lighter going west and south.
Stem Disease, Beech Bark	Beech, American	Genesee	10	0	0	unknown	Salvaged 26 MBF, 170 cords on 50 acres 3 sales [illegible]
Stem Disease, Beech Bark	Beech, American	Genesee	19	0	0	increasing	Town of Bethany (Jeff Berkepeile 716-[illegible])
Stem Disease, Beech Bark	Beech, American	Herkimer	0	0	0	increasing	None.

Stem Disease, Beech Bark	Beech, American	Jefferson	0	0	0	increasing	None.
Stem Disease, Beech Bark	Beech, American	Lewis	0	0	0	increasing	Severe mortality observed during aerial detection flight.
Stem Disease, Beech Bark	Beech, American	Madison	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Monroe	42	0	0	increasing	Salvaged 26 MBF, 175 cords on 59 acres (3 sales) for October.
Stem Disease, Beech Bark	Beech, American	Niagara	0	0	0	increasing	Heaviest mortality in Allegheny co. Gets lighter going west and south.
Stem Disease, Beech Bark	Beech, American	Oneida	0	0	0	increasing	Northern Oneida has severe beech mortality observed from aircraft.
Stem Disease, Beech Bark	Beech, American	Onondaga	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Orleans	12	0	0	increasing	Beech is very low quality with much decay.
Stem Disease, Beech Bark	Beech, American	Oswego	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Regionwide	0	?acres	?acres	increasing	Increase may be attributed to cool summer weather.
Stem Disease, Beech Bark	Beech, American	Saratoga	? acres	0	0	stable	Insect population is very low at this time.
Stem Disease, Beech Bark	Beech, American	Steuben	50	0	0	increasing	Town of West Union.
Stem Disease, Beech Bark	Beech, American	Steuben	80	?	0	increasing	Town of Fulteney. (Paul D. Hogan 716-642-8583)
Stem Disease, Beech Bark	Beech, American	Steuben	0	20	0	increasing	Town of Fulteney. (Alfred H. King 716-223-5248)
Stem Disease, Beech Bark	Beech, American	Steuben	32	20	0	increasing	None.
Stem Disease, Beech Bark	Beech, American	Steuben	0	?acres	0	increasing	Details on locations and value of stumpage on report form.
Stem Disease, Beech Bark	Beech, American	St. Lawrence	0	0	0	increasing	Slow spread northwestward.
Stem Disease, Beech Bark	Beech, American	Tioga	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Tompkins	? acres	? acres	? acres	increasing	Advance of Beech decline not rapid but continues to attack new areas.
Stem Disease, Beech Bark	Beech, American	Wayne	0	17	0	increasing	Poor quality Beech.
Stem Disease, Beech Bark	Beech, American	Wayne	24	24	0	increasing	Salvaged 26 MBF, 175 cords on 59 acres (3 sales) for October.
Stem Disease, Beech Bark	Beech, American	Wyoming	0	0	0	increasing	Heaviest mortality in Allegheny co. Gets lighter going west and south.
Stem Disease, Black Knot	Cherry, Black	Lewis	0	40	0	increasing	Very severe damage; some mortality.
Stem Disease, Canker, Blister Rust	Pines, White	Franklin	0	1000	125	increasing	Heaviest infections are plantations 20-25 yrs old (incl. natural stands
Stem Disease, Canker, Blister Rust	Pine, White	Fulton	0	? acres	? acres	increasing	Good spore dispersal conditions expected to cause increased infection.
Stem Disease, Canker, Blister Rust	Pine, White	Hamilton	0	? acres	? acres	increasing	Good spore dispersal conditions expected to cause increased infection.
Stem Disease, Canker, Nectria	Birch, Black	Chemung	0	0	0	increasing	Nectria galligena killed 25 cords valued at $125.
Stem Disease, Canker, Nectria	Maple, Sugar	Steuben	10	0	0	increasing	Mortality loss of 10 cords valued at $5.
Stem Disease, Canker, Scleroderris	Pine, Red, Scotch	Fulton	0	?acres	0	increasing	Report for western Fulton County.
Stem Disease, Canker, Scleroderris	Pines, Hard	Herkimer	0	0	0	increasing	Generally light but substantial increase over past years.
Stem Disease, Canker, Scleroderris	Pines, Hard	Jefferson	0	0	0	increasing	Generally light but substantial increase over past years.
Stem Disease, Canker, Scleroderris	Pines, Hard	Lewis	0	0	0	increasing	Generally light but substantial increase over past years.
Stem Disease, Canker, Scleroderris	Pines, Hard	Oneida	0	0	0	increasing	Generally light but substantial increase over past years.
Stem Disease, Canker, Target	Basswood, American	Monroe	0	0	0	unknown	At least 30% of trees had scar cankers.
Stem Disease, Mistletoe, Eastern Dwarf	Spruce, Black, Red	Clinton	0	?acres	0	unknown	Positive identifications; raise no mortality; does not always cause brood.
Stem Disease, Mistletoe, Eastern Dwarf	Spruce, Black, Red	Essex	0	?acres	0	unknown	Positive identifications; causing mortality; does not always cause brood.
Stem Disease, Mistletoe, Eastern Dwarf	Spruce, Black, Red	Franklin	0	?acres	0	unknown	Positive identifications; causing mortality; does not always cause brood.
Stem Disease, Mistletoe, Eastern Dwarf	Spruce, Black, Red	Fulton	0	?acres	0	unknown	Positive identifications; causing mortality; does not always cause brood.
Stem Disease, Mistletoe, Eastern Dwarf	Spruce, Black, Red	Hamilton	0	?acres	0	unknown	Positive identifications; causing mortality; does not always cause brood.
Sucking Insect, Adelgid, Balsam	Fir, Balsam	Clinton	?acres	0	0	increasing	Began in 1984 and has increased in severity at elevations over 1000 feet
Sucking Insect, Adelgid, Balsam	Fir, Balsam	Essex	?acres	0	0	increasing	Began in 1984 and has increased in severity at elevations over 1000 feet
Sucking Insect, Adelgid, Balsam	Fir, Balsam	Franklin	?acres	0	0	increasing	Began in 1984 and has increased in severity at elevations over 1000 feet
Sucking Insect, Adelgid, Balsam	Fir, Balsam	Fulton	?acres	0	0	increasing	Began in 1984 and has increased in severity at elevations over 1000 feet
Sucking Insect, Adelgid, Balsam	Fir, Balsam	Hamilton	?acres	0	0	increasing	Began in 1984 and has increased in severity at elevations over 1000 feet
Sucking Insect, Adelgid, Red Pine	Pine, Red	Dutchess	0	0	0	increasing	Found for first time in town of La Grange and surrounding areas
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Essex	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Franklin	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Fulton	? acres	? acres	? acres	increasing	Beech scale attacking smaller beech.
Sucking Insect, Aphid, Balsam Woolley	Fir, Balsam	Fulton	0	1000	750	increasing	Extensive dieback noticed.
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Fulton	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Hamilton	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Aphid, Balsam Woolley	Fir, Balsam	Hamilton	0	1000	750	increasing	Extensive dieback noticed.
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Warren	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Aphid, Balsam Woolley	Beech, American	Washington	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Scale, Beech	Beech, American	Clinton	? acres	0	0	stable	Insect population is very low at this time.
Sucking Insect, Scale, Beech	Beech, American	Hamilton	? acres	? acres	? acres	increasing	Beech scale attacking smaller beech.

	Sucking Insect, Scale, Oystershell	Ash, Beech, Birch, Maple	Fulton	? acres	0	? acres	increasing	None.
	Sucking Insect, Scale, Oystershell	Ash, Beech, Birch, Maple	Hamilton	? acres	0	? acres	increasing	None.
	Sucking Insect, Scale, Oystershell	Beech, American	Jefferson	0	0	0	increasing	Generally light but noticeable increase over past years.
	Sucking Insect, Scale, Oystershell	Beech, American	Lewis	0	0	0	increasing	Generally light but noticeable increase over past years.
	Sucking Insect, Scale, Oystershell	Beech, American	Lewis	0	0	0	increasing	Substantial increase in the number of scale noted.
	Sucking Insect, Scale, Oystershell	Beech, American	St. Lawrence	0	0	200	increasing	Heavy at Cranberry Lake Campsite. Greater population than 1970's.
6	Sucking Insect, Scale, Pine Needle	Pine	Fulton	0	? acres	? acres	increasing	Appears to be general increase in pop.'s on ornamentals.
7	Sucking Insect, Scale, Red Pine	Pine, Red	Dutchess	0	0	0	increasing	Found first time in towns of La Grange and Northeast.
8	Sucking Insect, Spittlebug, Saratoga	Pines, Red, Scotch, White	Fulton	0	50	25	increasing	Damage occuring to natural eastern white pines in southern Fulton County.
9	Sucking Insect, Spittlebug, Saratoga	Pines, Red, Scotch, White	Hamilton	0	50	25	increasing	Damage occuring to natural eastern white pines in southern Fulton County.
10	Vascular Disease, Dutch Elm	Elm, American	Fulton	0	0	0	increasing	Mortality observed in forest stands from Dutch elm disease.
11	Vascular Disease, Sapstreak	Maple, Sugar	Jefferson	0	0	0	increasing	One new infection center; additional infected trees all prior sites.
12	Vascular Disease, Sapstreak	Maple, Sugar	Lewis	0	0	0	increasing	One new infection center; additional infected trees all prior sites.
13	Wood Borer, Beetle, Bronze Birch	Birch, Gray, Paper, Yellow	Fulton	0	0	0	increasing	Attacking declining birch.
14	Wood Borer, Beetle, Bronze Birch	Birch, Gray, Paper, Yellow	Hamilton	0	0	0	increasing	Attacking declining birch.
15	Wood Borer, Beetle, Oak Twig	Oak, Red	Steuben	?acres	0	0	increasing	Found at various locations throughout Steuben County.
	Wood Borer, Beetle, Pine Bark	Pine, White	St. Lawrence	0	0	0	unknown	Town of Fowler. 50 trees affected.
	Wood Borer, Beetle, Sugar Maple	Maple, Sugar	Chemung	20	0	0	increasing	Microsites appear where poor drainage has been factor in Maple [illegible]
	Wood Borer, Beetle, Sugar Maple	Maple, Sugar	Genesee	25	0	0	unknown	None.
	Wood Borer, Beetle, Sugar Maple	Maple, Sugar	Steuben	60	0	0	stable	Mortality loss of 100 cords valued at $500.
	Wood Borer, Beetle, White Pine Weevil	Pine, White; Spruce, Norway	Herkimer	0	0	0	increasing	Significant increase in number of trees attacked.
21	Wood Borer, Beetle, White Pine Weevil	Pine, White; Spruce, Norway	Jefferson	0	0	0	increasing	Significant increase in number of trees attacked.
22	Wood Borer, Beetle, White Pine Weevil	Pine, White; Spruce, Norway	Lewis	0	0	0	increasing	Significant increase in number of trees attacked.
23	Wood Borer, Beetle, White Pine Weevil	Pine, White; Spruce, Norway	Oneida	0	0	0	stable	Significant increase in number of trees attacked.
24	Wood Borer, Beetle, White Pine Weevil	Spruce, Norway	Steuben	5	0	0	stable	Town of Frattsburg [Guenther Leonhardt 607-522-4582]
25	Wood Borer, Moth, European Pine Shoot	Pine, Red	Steuben	0	5	0	increasing	Town of Caton [Hermann Rittler 607-524-6382]
26	Wood Borer, Moth, Nantucket Pine Tip	Pine, Pitch	Suffolk	0	0	0	unknown	Foliage discolored, trees dwafted, crooked stems.
27	Wood Borer, Moth, Pitch Tube	Pine, Pitch	Suffolk	0	0	0	unknown	Very common to see one or two globes of pitch on branches and [illegible]

Dennis

11/13/86

TO: FPM Staff
FROM: M. Miller-Weeks

Attached you will find copies of the 1986 Pest Conditions Reporting Sheet. Please fill out a sheet for each pest problem, pest survey, or suppression project you were involved with during 1986. The information will be incorporated into the 1986 Pest Conditions Report, along with the State Reports. Please return the completed forms to me by November 21, 1986. Thank you for your assistance.

1986 PEST CONDITIONS REPORT WORK SHEET

PEST (COMMON NAME): Spruce budworm

(SPECIFIC NAME): Choristoneura fumiferana

HOST: Balsam fir, red and white spruce

PRESENT CONDITION: Population levels extremely low on

AREA (TOTAL ACRES): Grindy & Penobscot Indian lands

LOCATION: and Loring Air Force Base

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: sharply declining trend.

FUTURE: ? Continued very low level populations

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

None

COMMENTS: Biological evaluations based on pheromone trapping, L2 counts and tree condition will find little budworm hazard in 1987.

1986 PEST CONDITIONS REPORT WORK SHEET

West Point

PEST (COMMON NAME): Gypsy moth

(SPECIFIC NAME): Lymantria dispar

HOST: Oaks

PRESENT CONDITION:

AREA (TOTAL ACRES):

LOCATION:

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Declining in western and southern edge of reservation. Increasing in northeast.

FUTURE:

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS: 2548 acres treated with Dipel 2L using a UH-1D helicopter and Isu-flow pesticide dispersal unit. 20 BIUs/acre at 96 fl oz per acre with 2% Bond sticker. Good foliage protection in 3 of 4 spray blocks. Cost unknown.

1986 PEST CONDITIONS REPORT WORK SHEET

Seneca Lands

PEST (COMMON NAME): Gypsy moth

(SPECIFIC NAME): Lymantria dispar

HOST: Oaks

PRESENT CONDITION:

AREA (TOTAL ACRES): Building population, 1st 6M

LOCATION: infestation in formation / NY

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT: Building population in previously uninfested area.

FUTURE: Infestation will probably persist for a while

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

Aerial application of Sevin+Oil to 7855 acres with 2 Piper Brakes. Excellent population reduction and some foliage protection.

COMMENTS:

1986 PEST CONDITIONS REPORT WORK SHEET

PEST (COMMON NAME):

(SPECIFIC NAME):

HOST:

PRESENT CONDITION:

AREA (TOTAL ACRES):

LOCATION:

SEVERITY (INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES):

LOSSES (INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES):

TREND:

PAST TO PRESENT:

FUTURE:

CONTROL PROJECTS (METHOD, MATERIAL, ACRES, COST, RESULTS):

COMMENTS:

M. Wheeler

The State of Forest Health in New York in 1986

by Michael J. Birmingham

April 14, 1987

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INTRODUCTION

Forest Decline Definition

This report describing the state of forest health in New York utilizes the term "decline" to relate the condition of our forests and trees.

Decline can result from insects, diseases, droughts, temperature extremes, wind, flooding, chemical poisoning, air pollution, nutrient deficiencies, or a combination of any or all of the above. The term decline, as used in this report, will encompass the various known causes of observed declines, and will incorporate the observed declines where the cause or causes are presently unknown or uncertain to the scientific community.

The information related was gathered by DEC forestry staff in all of our regions: we also have sought and received information from the College of Environmental Science and Forestry, Cornell University and the U.S. Forest Service and our counterparts in the other northeastern states.

Forest decline symptoms and effects

Declining forests or trees may have one or more symptoms: misshapen, sparse, missing, tufted or discolored foliage; no foliage or vegetative buds (dead); branch dieback; breakage or deformities of branches or trunk; bunching of branches (brooming) or uprooted, loss or shredding of bark.

Effects of forest declines on trees are: failure to reproduce, reduction in relative abundance, poor form, reduced growth rates, and mortality.

Forest Decline History

Forest declines are not new. The first documented tree decline in New York was red spruce in Rensselaer County in 1843. Declines continued since that date. Numerous pests of trees have been introduced to New York within the past 150 years. Many of these exotic pests lack natural controls and our native trees lack resistance to them. Consequently, these pests spread rapidly and increase in numbers. The cumulative effects of introduced pests on trees is the single greatest factor in the decline of forest health in New York. Similarly, introduced tree species often have little natural resistance to native insects and disease. We are beginning to recognize pest problems in introduced trees caused by native pests.

Air pollution was identified as a cause of forest declines more than 100 years ago. Damage to forests occurred downwind of smelters. Ozone damage to eastern white pine has been recognized. More recently, scientists have shown that high levels of acid rain, toxic metals and photo oxidants are associated with forest declines, but their precise role in stressing or directly killing trees is not yet established.

FIVE MAJOR STATEWIDE TREE DECLINES

Forest declines occur in New York State. There presence does not mean that forests will eventually disappear. Forests are actually thriving in the state. Our forest acreage has increased nearly 8 million acres in the past century and growth exceeds harvest by a factor of two. What is happening, however, are that insects, diseases, and declines are affecting our forests. When a tree dies, another takes its place. We should be aware of these problems and work to lessen the damage.

What follows is a description of five statewide forest health problems, what the prospects are for tree survival and what can be done to lessen the decline's impact.

American chestnut

Chestnut blight, an introduced fungus, caused the most important tree decline in New York. It has killed more trees than any other disease and it continues to prevent American chestnut from reaching its potential size and abundance.

Chestnut trees continue to be produced from stump sprouts, but also from nuts. The chestnut blight does not kill the chestnut tree below the root collar. When abundant light reaches the root collar, it initiates bud formation and sprouting. Some chestnut trees are reaching nut bearing age. These are trees that have escaped the disease. There is no scientific proof that nut bearing chestnut trees are immune to the disease.

In some states - not including New York - chestnut trees are infected with a non-lethal, natural strain of blight, which prevents the lethal strain of the disease from girdling and killing the tree. Department foresters introduced in New York State the nonlethal (hypovirulent) strain of the blight in 1985 and 1986. Results of these inoculations in New York are not yet known, but in Europe, the hypovirulent strain has spread naturally and European chestnut trees are recovering from the chestnut blight.

Blighted trees produce cankers on the bole of the tree. The bark at the canker site becomes roughened and splits. The canker kills the above ground portions of the tree by girdling. Foliage of diseased chestnut eventually withers and then dies. American chestnut may recover as have European chestnuts from the blight. Intensive research is underway to discover a means for sublethal strains of the disease to spread naturally as they have done in Europe. Genetic engineering may be applied effectively to develop strains of the blight that block the lethal strain from girdling the tree.

American beech

Beech bark disease is killing American beech throughout the State. The disease has killed more trees in New York than any other cause, except for chestnut blight. Not all American beech are vulnerable to the disease. In fact, forest stands infected 25 years ago still have mature beech. Beech continue to produce beechnuts. Beech also reproduce from root suckers resulting in thickets of beech suckers.

For beech nectria to enter the bark of beech, it must enter a wound usually caused by the beech bark scale, an introduced insect. As the scale spread westward across the State, beech bark disease increased in frequency and intensity. Scales cause the bark to turn white. The nectria fungus causes cankers that roughen the bark. Tiny red fruiting bodies of the nectria are visible inside the bark cracks. Beech foliage of nectria infected trees turn yellow and then brown.

Beech is a relatively important trees species. It provides food for wildlife and its wood is used for fuel and lumber. Many other tree species are more valuable for lumber than beech. Beech sprouts add to the cost of forest management because they crowd out more desirable tree species and timber owners incur expenses in destroying beech sprouts. Beech will remain an important component of our forest stands.

Ashes

Ash yellows is another major cause of tree declines in New York. White and green ashes are susceptible. The disease is caused by an organism described as a bacteria without a cell wall. Ash yellows may kill entire stands of ash or it may kill only some. Ash yellows occurs throughout New York State.

Ash yellows foliage symptoms include sparse, tufted foliage. Foliage may be yellowish. More advanced symptoms are branch dieback. Severely declining trees have live foliage growing from the trunks and "witches brooms" at the base of the tree.

Ash continues to reproduce. It may be even more abundant now - after decades of decline from ash yellow -due to large acreages of agricultural lands reverting back to forests. Ash colonizes abandoned agricultural lands and occupies these sites until more shade tolerant tree species replace them. Succession from ash to more shade tolerant trees may take a century or more.

Elms

A major cause of tree declines is introduced Dutch elm disease, which completed its westward spread in New York by the 1960's. The three native species of elms, (American, rock and slippery) are vulnerable to the disease, although many isolated, young and protected elms survive.

Elms often produce seeds at an early age before they are killed by the disease. For this reason, elms continue to reproduce in New York. Elms which reproduced since the first wave of the disease are now dying from the disease. The second wave of the disease has been aided by an increase in beetle populations. Elm bark beetles, including an introduced European species (the most important vector of the disease), carry the disease to elms. The disease also spreads by root contact between elms. The disease occurs throughout New York State.

Dying elm foliage wilts, turns yellow and curls. More advanced symptoms are leaf fall and death of affected branches. Tree death follows within one or two years of first foliage symptoms.

Elms can be protected from Dutch elm disease by controlling the elm bark beetles. Beetles are controlled with insecticides and destroying the breeding habitats. Pruning of diseased branches and injections with fungicides can prevent the spread of the fungus to the main stem and death of the tree. Control efforts are most effective when programs cover several thousand acres. Community wide programs can reduce elm losses to less than one percent annually.

Elm yellows disease found in the Finger Lakes Region causes similar foliage symptoms to Dutch Elm disease and also kills elms. This disease is considered more serious than Dutch elm disease in the Finger Lakes Region. It can be controlled by insecticide sprays to kill leaf infesting insects that vector the disease.

Elms will remain a part of our landscape. However, there is no reason to believe that they will return as majestic monarchs given the two virulent diseases and the apparent lack of natural resistance among our native elm species.

Oak

Oak decline is a major forest health problem. Oak decline is increasing probably due to an increase in gypsy moth defoliation, which now occurs periodically throughout the State. Declines are heaviest in the southern half of New York where oaks are most plentiful. Known causes are the two-lined chestnut borer and armillaria root rot, both of which can kill the tree. Drought also increases the rate of oak mortality. Oaks vary widely in their ability to withstand defoliation. The more vigorous oaks experience high rates of mortality following defoliation, because vigorous oaks have large crowns and energy demands, which when refoliation occurs deplete the tree's energy reserves, making the tree more vulnerable to insect and disease attacks.

Declining oaks have undersized and discolored leaves. Severe decline symptoms are branch dieback, production of foliage along the bole of the tree and death of the tree.

Oaks are becoming less common. When oaks decline, forest stands generally regenerate to other species - most commonly red maple. Oak decline occurs throughout southern New York. It is particularly heavy on Long Island and southeastern New York. It occurs to a lessor degree in the Capitol District Region . Oak decline has recently shown up in the central and southern Finger Lakes region.

Oaks remain abundant in New York. Many oaks occupy drier sites formerly occupied by American chestnut. Also oaks are regenerating on lands formerly used for agriculture. Oaks do not seem to reproduce well within the forest. Regeneration is inhibited due to insufficient sunlight. Oaks are not tolerant of shade.

The management of oaks can help in improving reproduction and survival. Clear cutting increases the chance for oak reproduction and survival. Controlling defoliators of oaks reduces oak mortality and promotes continued growth. Current practices of selective thinning does not open up the forest floor to much sunlight and is not conducive to oak regeneration.

TREE DECLINES OF UNKNOWN CAUSES

The status of forest health in New York is under investigation. Several tree species are declining in the State from unknown causes or the causes are speculative. Described below are major declines on which information relating to the cause of the decline is weak.

Ash dieback

Ash diebacks other than those cause by ash yellows disease, have not been adequately studied. Air pollution, drought and three pathogens have been implicated in these declines.

Sugar maple decline

Sugar maples are declining in Lewis County from undetermined causes. Declines are most severe on wet sites and sugar bushes. Poor taping practices, acid soils and soil compaction by machinery and cattle are suspected causes. Declines have also been attributed to over maturity, defoliation, drought and acid rain.

Spruce decline

Red and black spruces are declining throughout the Adirondacks. One issue unresolved is the role of eastern spruce beetle in the declines. Some argue that the beetle attacks and kills only stressed spruces. Others believe that the beetle attacks and kills spruce over 10 inches in trunk diameter. Acid rain could cause stress in spruce by leaching nutrients from the needles or acidifying soils and making nutrients unavailable to the trees. Winter injury of spruce is also suspected. Air pollution could play a role in winter injury by depositing nitrogen, which would promote growth in the fall. Unharden foliage would be killed by freezing temperatures.

Tamarack decline

The eastern larch beetle is associated with dead and dying tamarack. The issue is whether the beetle will attack and kill healthy tamaracks or only stressed trees. Since the decline is widespread, air pollution could be a stress factor. Older tamaracks decline more than younger trees. Nematodes have been observed in declining tamarack. Their role in the declines is unknown.

Yellow birch decline

Mature and over mature yellow birch are declining more than younger birches. Declines are more severe where forests have been disturbed by logging, mortality from beech bark disease, or red spruce decline, since birches are very sensitive to changes in soil temperatures. The declines are widespread and could be incited by air pollution damage.

LEARNING MORE ABOUT FOREST HEALTH

Acid Rain

The Forest Response Program is a national program to provide information on how forests respond to airborne chemicals was initiated in 1986. Three components of the Program will provide information of forest declines in New York: Spruce-fir cooperative including the mountain cloud chemistry, eastern hardwoods cooperative and national vegetative survey. The spruce-fir cooperative supports 35 studies. The other two programs are in the planning stages. For details on the spruce-fir cooperative see the booklet entitled: "Spruce-fir Research Cooperative, USDA, Forest Service, Northeastern Forest Experiment Station", 370 Reed Road, Broomall, PA 19008.

A four year study, sponsored by the Electrical Power Research Institute is scheduled to be completed in 1988, evaluates the role of acid deposition in producing changes in forest nutrient cycling. Data is collected in New York at White Face Mountain and Huntington Forest. For additional information on the study see the paper entitled: "Integrated Forest Study on Effects of Atmospheric Deposition", which describes the study plan. A copy of the plan is available from Dr. Ernest A. Bondietti, Environmental Sciences Division, Oak Ridge National Laboratory, P.O. Box X, Building 1505, Oak Ridge, TN 37831. The department is cooperating with the New York State Energy office, one of the sponsors of the EPRI research, to evaluate the study plans and make recommendations to the the Energy office.

Cooperation with other states

Department forestry staff are working with other states in learning about forest health problems. Vermont is providing the department information on the role of ghost moth in high elevation spruce declines. New Hampshire provided research results on the role of wind in declines of balsam fir at high elevations. Connecticut has provided hypovirulent strains of chestnut blight, information required to detect red pine adelgids and information on natural controls of red pine scale. Pennsylvania and West Virginia provided information on the relationships of gypsy moth defoliation to oak declines. The U.S. Forest Service has organized meetings of state representatives on forest health monitoring to share information and to plan joint efforts in gathering and sharing forest health survey information.

Department investigations

Department forestry staff conduct identification and detection surveys and assists the Forest Service and university scientists in learning about forest health. In the past year, department efforts led to increased knowledge on several tree declines. Among the newer problems include a petiole borer of black cherry causing premature leaf drop; large tar spot of Norway maple causing foliage discoloration and premature leaf drop; eastern dwarf mistletoe causing brooming and mortality in red and black spruces; pear thrips damage to sugar maple leading to misshapen, discolored and undersized leaves; Japanese black pine decline from pinewood nematodes, and red pine decline following stresses due to competition and wet sites leading to attacks by beetles and blue stain.

Studies in cooperation with Forest Service and College of Environmental Science and Forestry scientists resulted in updates in our knowledge of the affects of Scleroderris canker on red and Scotch pines and defoliators on sugar maples.

Aerial detection flights by the department resulted in maps and defoliation statistics for most of the 62 counties in New York.

Forest health report

Department forestry staff are reporting three times annually on the state of forest health in their respective counties. Annual compilations of forest health data make assessments of forest health changes possible. Data on forest health are also provided to researchers.

Spruce-fir decline, spruce beetle and eastern dwarf mistletoe surveys

The US Forest Service and department have completed three years of surveys leading to the documentation of red spruce and balsam fir declines in the Adirondacks and Tug Hill Plateaus. The published report on the results of the 1986 study is scheduled for March 31, 1987. Results of this survey are provided to the national Forest Response Program described below.

CONCLUSIONS

Forest health is one of the most important environmental issues facing us today. Forests cover 62 percent of the land area of the State. Forest affect the air we breath, water quality, provide employment to thousands of people in the wood using businesses and recreation for millions. Forests are the homes of wildlife and many rare and endangered plant species are dependent on healthy forests.

Introduced tree pests are the primary known causes of declines. Continued spread and buildup of exotic pests may result in further forest declines and may prevent some species of trees from recovering. Air pollution may be increasing tree susceptibility or vulnerability to insects and diseases. Air pollutants may affect trees directly or indirectly.

A substantial effort is being made to better understand the causes of tree declines and in particular air pollution's role. In addition to these studies, there is a growing need to reverse damages that have already occurred to forests. We need to find ways for forests to recover from such diseases as chestnut blight, beech bark disease, and ash yellows.

We have every reason to expect our forests will recover and continue to prosper. There is a growing public recognition that forest health is vital for a good environment. With this recognition has come increased efforts to learn about the causes of forest declines and take remedial actions to protect the forests.

APPENDICES

REGIONAL REPORTS

Introduction to Regional Reports

The following information is arranged by the regions outlined on the map at the end of this report.

We have listed and discussed the major tree problems in each region. The forests statewide and regionally are healthy. However, problems are present, some quite visible, of which the reader may or should be aware.

APPENDIX A
CAPITOL DISTRICT AND
CATSKILL-LOWER HUDSON REGION

Austrian pine

Older Austrian pines are severely damaged by the fungus disease, tip blight, which kills new growth. Older trees are sometimes killed by the fungus or are weakened and die from other causes.

Japanese black pine

Japanese black pines are an introduced species planted primarily on Long Island. They are resistant to salt sprays, making them desirable for plantings near salt water.

More than 800 Japanese black pines died in 1986 on Orient Point State Park. Death was due to pinewoods nematodes, which are carried to the pines by wood boring beetles.

Nematodes kill Japanese black pines within one or two growing seasons. Pines infested early in the season are usually dead by fall.

Foliage of infested trees turn yellow and then brown. Numerous holes caused by wood boring beetles including round and flat headed borers can be seen in the nematode infested trees. Blue staining fungi carried by the beetles are also present in declining and dead pines.

The Department is conducting a survey to determine the extent and degree of damage caused by the nematode. State Park officials have been alerted. They have been informed to destroy infected trees to reduce the breeding habitats of the beetles vectoring the nematodes. Alternative species of trees are being considered as substitutes for planting where nematodes occur.

Miscellaneous problems

The annual pests are present as usual, causing unsightliness, but little serious damage to the tree. Included are: birch leaf miner on birches; eastern tent caterpillar on cherry; and fall webworm on hardwoods.

Road salt continues to stress roadside trees, especially the sugar maples which has little tolerance for salt.

Mottled, wrinkled and deformed sugar maple and ash leaves were caused by the pear thrips. Again, unsightliness is the primary damage.

Antracnose on dogwood causes death of the shrub. The disease caused by a fungus is apparently introduced and one in which dogwoods have no resistance to. Dogwoods throughout the region have died. Infected dogwoods turn brown and die. Death of the dogwood occurs quickly following foliage symptoms. It is not known if the anthracnose problem will eventually spread throughout the state or, if the disease does spread, if it will kill all the dogwoods.

Pitch pine

Pitch pine are dwarfed, have crooked branches, multiple stems and discolored foliage due to the Nantucket tip moth (introduced) and Eastern pine shoot borer. Repeated attacks may change the size and shape of trees. Damage from tip moths is more severe on nutrient and humus deficient sites. Other organisms causing abnormal foliage coloration and appearance are: pitch mass borers, needle miners, needle feeders, and needle tiers. The major cause of foliage discoloration is "fall browning". Newsday and Channel 3 investigated the cause of needle discoloration that had sparked public interest. An abnormally dry and calm fall allowed the dead three year old needles to cling to the tree rather than drop of as they normally do. Declining over-story pitch pines are replaced with laurel, other pitch pines and oaks.

Pitch pine will not die from the above damage. The problem is more important for cosmetic reasons. Treatments are not necessary to save pitch pine. However, soil fertilization should reduce European pine shoot moth damage.

Red pine

Red pine are declining rapidly in Dutchess County. In Westchester and Putnam Counties, most of the red pine is dead. Cause of the mortality are red pine scale and red pine adelgids, both introduced. Red pine dies within five years of infestation. The scale occurs as far north as the Town of Northeast, Dutchess County. The adelgid is found as far north as the Town of LaGrange, Dutchess County. The scale may be reaching its northern limits in New York. The adelgid, however, is capable of living farther north than the scale. Average annual movement of scales and adelgids is two miles. Stable infestations of red pine scale also occur in Rockland and Orange Counties. This is a serious problem and treatment is ineffective. The planting of red pine in the southern portion of this region is definitely not recommended. It is also recommended that round wood intented for areas that are not infested with red pine scale and adelgids have the bark removed before shipment.

APPENDIX B
EASTERN, WESTERN AND NORTHERN
ADIRONDACK REGIONS

Balsam fir

The natural and highly visible phenomena called fir wave is caused by wind injury. Balsam fir on high elevation forests die in waves. Fir on the windward side are rocked back and forth by the wind. Eventually, roots are damaged to a point where the tree dies. Bands of fir die along the leading edge of the forest. As balsam fir on the windward side of the forest dies, interior fir are exposed to wind. The process continues until the fir wave moves throughout the forest. Beneath the dead fir we generally find dense fir and spruce reproduction, replacing the older forest.

Eastern white pine

White pine in the Adirondack regions remains at high risk to white pine blister rust. The disease, which requires currants or gooseberries to complete part of its development, is capable of killing pines of all ages. Favorable weather and abundant alternate hosts has resulted in high lethal infection rates of pine. Destruction of the alternate hosts may make eastern white pine a viable choice for plantation trees. In some locations, the relative scarcity of alternate hosts results in a high survival rate of pines. White pine thrives in many locations of the Adirondacks, growing in dense stands or as scattered trees, often over topping hardwoods it is associated with.

Miscellaneous problems

The annual pests are present as usual, causing unsightliness, but little serious damage to the trees in 1986. Included are: cherry scalloped shell moth on black cherry; fall webworms on hardwoods; maple leaf cutter and saddled prominant on maples; oaks from oak leaf tier; satin moth defoliation of poplar and willow; pine sawflies (several species) on pines; Norway maple infected by large tar spot disease; ash, conifers and poplar by frost damage. Branch breakage occurred to hardwoods and particularly aspen from ice.

Deformity of eastern white pine and Norway spruce occurred is due to white pine weevil boring. Damaged causes multiple main stems reducing the trees' value for lumber. The balsam twig aphid also caused deformity.

Minor damage was caused by oystershell scale to American beech, birch and maples. Eastern white pine was similarly damaged by Saratoga spittle bug. Generally, infested trees recover from oystershell scale and spittle bug attacks.

Other minor problems include damage to conifers from winter injury; balsam fir infestation by woolly adelgid (imported); birches by bronze birch borer. This latter insect can kill small birches on poor sites. Red and sugar maple foliage was damaged by anthracnose disease, which rarely kills more than some of the leaves and twigs.

Roadside red pines in the Lake Placid and Saranac area are declining from road salts. Conifer foliage is damaged by salt sprays. Salt damages the roots of pines and leads to declines in vigor.

Red and black spruces

Red and black spruce decline and mortality is extensive in the Adirondacks and Tug Hill Plateau regions. In 1986, as a result of three years of studies by the Department and the U.S. Forest Service, the locations, severity and known causes of the declines were determined. The primary agent causing damage to trees over 10 inches in trunk diameter is the eastern spruce beetle.

As a result of an intensive investigation by Dr. Hawksworth (U.S. Forest Service), eastern dwarf mistletoe was identified for the first time in New York as an important problem causing spruce decline. Mistletoe infected trees may total upwards of 40 percent of the trees.

We also found ghost moths, which can kill spruce, armillaria root rot and cytospora canker. The total impact of these organisms are unknown. In the case of the ghost moth, cage tests have demonstrated that a single moth larvae is capable of killing a young tree.

The studies are continuing so that we can begin to concentrate on studying the unknown causes of declines and mortality.

Red and Scotch pines

The European strain of scleroderris canker is still present in the region, but is not as active as in the past. We are continuing to monitor for the presence of this disease, since wet, cool weather could lead to an increase. The European strain of the disease has killed up to 90 percent of red and Scotch pine stands that are 30 to 40 years old. Since 1981, the disease has not spread, nor is it killing older trees.

Sugar maple

Maple sap streak is a lethal fungus disease of sugar maples in Lewis County. New infections were found in several maple stands. The disease does not appear to be the primary cause of sugar maple decline in the region. Most sugar maple declines are occurring in old growth stands. Frequently, declining sugar maple stands are on wet, heavily grazed sites. Tap wounds could also be a factor as could repeated defoliation and drought conditions. The role of acid rain and toxic metals in the declines of sugar maple are undetermined. There is ample evidence that management practices are a primary cause of maple declines and increase the rates of infections by maple sap streak.

Sugar maple are also declining along roadways from the effects of salt.

Sugar maple borer is the most destructive insect of maple. It kills small diameter trees by girdling. Larger diameter trees can be severely wounded by the borings of the larval stage of the insect, which can partially girdle large trees and cause bark cracks and swellings. The borer is incapable of destroying whole forests. It is primarily a concern due to the degrade of lumber it causes.

Tamarack

Tamarack decline is at epidemic levels. The cause of the decline is not known, although larch beetles are involved. Mature tamarack have the highest mortality rates. Mature tamarack declined in the 1920's following larch sawfly defoliation and eastern larch beetle attacks, so we suspect a repeat of history is possible.

White spruces

White spruce at the Lake Placid Ski Jump show symptoms of magnesium deficiency, which include yellow foliage. The excessively well drained soils where the spruce grow are naturally nutrient deficient; therefore, these highly visible discolored trees are a victim of poor soil and not any outside agent.

APPENDIX C
LAKE PLAIN, SOUTHWEST, AND SOUTH-CENTRAL HIGHLANDS

Eastern white pine

White pine weevil damage is severe in the lake plain region. White pine is susceptible to weevil attacks on heavy soils. Weevils kill the terminal shoot causing the laterals to turn upwards and form multiple stemmed trees.

Miscellaneous problems

The annual pests are present as usual, causing unsightliness, but little serious damage to the tree. Included are: red and maple foliage damage from pear thrips. Red pine shoot damage by the European pine shoot moth.

Sugar maple, as elsewhere in New York, is damaged by road salt. Most damaged trees survive for years, but they display early foliage discoloration, foliage drop and dieback of outer most branches.

Red and sugar maples

The lake plains region has a high incidence of red maple decline. Mortality is associated with high water levels.

Fall cankerworm defoliation damages maple. Some maple stands have died following a single complete defoliation. In one forested area in Cattaraugus County, maples died after defoliation in the early 1970's. Heavy white tail deer browsing has prevented the forest stand from regenerating to trees.

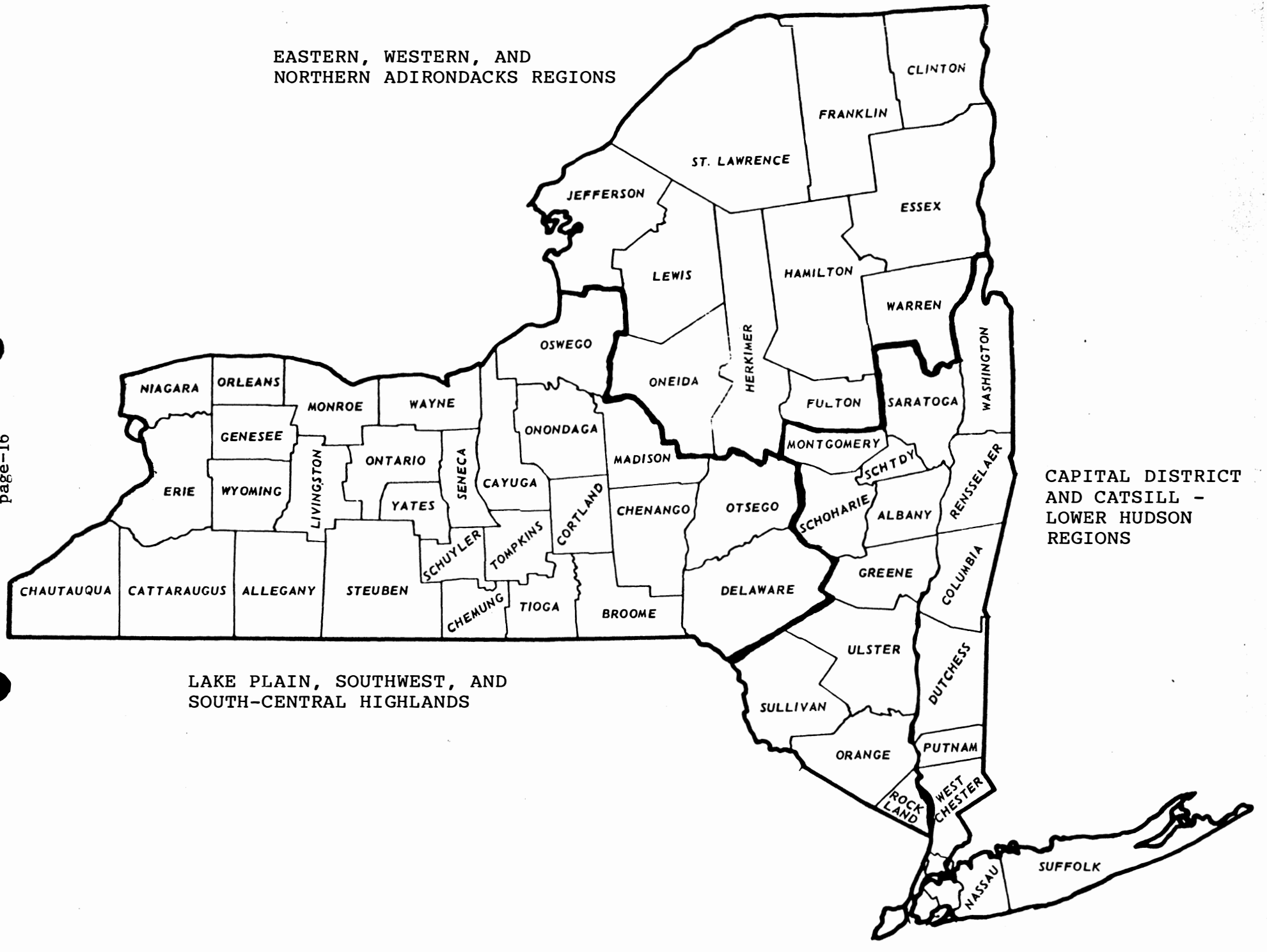
Sugar maple mortality in southern Delaware County from forest tent caterpillar defoliation in 1980 and 1981 resulted in red maple regeneration.

Red pine

Red pine are declining in 50 year old plantations. The decline is triggered by site limitations due to wetness or crowding. Pines growing on wet sites or under crowded conditions grow slowly after they reach 30 to 35 years of age. These slow growing pines are attacked by beetles, which weaken the tree by their feeding and girdling activities and infect the tree with blue stain fungi.

Symptoms of declining pines are reduced radial growth, beetle boring holes, yellow and then brown needles and dying of the crown from the top downward. Inspection of the interior of the pine reveals blue stain associated with beetle galleries. Trees die from the top downward as the blue stain advances down the tree.

Red pine are a valuable plantation species. Survival even to 50 year old trees can produce valuable crops. Many plantations survive well beyond 50 years. Survival rates can be improved by planting red pine on better drained sites and thinning stands before they become stagnated.


EASTERN, WESTERN, AND
NORTHERN ADIRONDACKS REGIONS
CLINTON
FRANKLIN
ST. LAWRENCE
ESSEX
JEFFERSON
LEWIS
HAMILTON
WARREN
OSWEGO
HERKIMER
ONEIDA
WASHINGTON
NIAGARA
ORLEANS
MONROE
WAYNE
FULTON
SARATOGA
ONONDAGA
GENESEE
MONTGOMERY
SCHDY
ONTARIO
MADISON
RENSSELAER
ERIE
WYOMING
LIVINGSTON
SENECA
CAYUGA
SCHOHARIE
ALBANY
YATES
CORTLAND
CHENANGO
OTSEGO
CAPITAL DISTRICT
AND CATSILL -
LOWER HUDSON
REGIONS
SCHUYLER
TOMPKINS
GREENE
COLUMBIA
CHAUTAUQUA
CATTARAUGUS
ALLEGANY
STEUBEN
DELAWARE
CHEMUNG
TIOGA
BROOME
ULSTER
DUTCHESS
SULLIVAN
ORANGE
PUTNAM
ROCK
LAND
WEST
CHESTER
NASSAU
SUFFOLK
LAKE PLAIN, SOUTHWEST, AND
SOUTH-CENTRAL HIGHLANDS